AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1.   (currently amended): A method of recovering data in a database of a database system stored in a datastore connected to a computer, the method comprising:

scanning a database log, wherein the database log records activities related to the database; and

identifying one or more individual objects to be recovered to a target time with reference to a backup time,

wherein an object is associated with different units of recovery, wherein one or more units of recovery require different levels of processing, and wherein the object is recovered utilizing the highest level of processing.

2.   (original): The method of claim 1, wherein the target time is user-defined.

3.   (original): The method of claim 1, wherein the backup time is user-defined.

4.   (original): The method of claim 1, further comprising analyzing the database log to detect when a unit of recovery begins and when the unit of recovery ends.

5.   (original): The method of claim 4, wherein an object is not recovered when the unit of recovery accessing that object ends before the target time and there are no pending writes for the object.

6.   (original): The method of claim 5, wherein the unit of recovery begins and ends before a checkpoint time, and wherein the checkpoint time occurs before the target time.

7.   (original): The method of claim 5, wherein the unit of recovery begins before a checkpoint time, and wherein the unit of recovery ends after the checkpoint time but before the target time.

8.   (original): The method of claim 5, wherein the unit of recovery begins after a checkpoint time, and wherein the unit of recovery ends before the target time.

9.   (original): The method of claim 4, wherein an object is recovered if the unit of recovery begins before the target time, and wherein the unit of recovery ends after the target time but before a current time, wherein the current time represents when object data is recorded to the database.

10.   (original): The method of claim 9, wherein the unit of recovery begins before a checkpoint time.

11.   (original): The method of claim 9, wherein the unit of recovery begins after a checkpoint time but before the target time.

12.   (original): The method of claim 4, wherein an object is recovered if the unit of recovery begins after the target time, and wherein the unit of recovery ends before a current time, wherein the current time represents when object data is recorded to the database.

13.   (original): The method of claim 1, wherein a backup is taken.

14.   (original): The method of claim 13, wherein the backup occurs prior to the target time and further comprising restoring data without restoring the database log.

15.   (original): The method of claim 13, wherein the backup occurs after the target time and further comprising restoring data and optionally restoring the database log.

16.   (original): The method of claim 13, further comprising restarting the database system with a conditional restart with defer all option.

17.   (original): The method of claim 1, further comprising flushing cache data to disk.

18.   (original): The method of claim 1, further comprising truncating the database log at the target time.

19.   (original): The method of claim 18, further comprising disabling access to the database and restarting the database system, wherein restarting detects uncommitted units of recovery.

20.   (original): The method of claim 19, further comprising creating a compensation log and appending the compensation log to the truncated database log beginning from the target time.

21.   (original): The method of claim 1, further comprising restoring the identified objects.

22.   (original): The method of claim 21, further comprising determining whether the database log should be applied to the restored objects to update the identified objects with current object data.

23.   (original): The method of claim 22, when the determination is made to apply the database log to the identified objects, further comprising optimizing the identified objects such that the identified objects may be restored without applying the database log to the identified objects.

24.   (original): The method of claim 23, if the objects can not be optimized, applying the database log to the restored objects.

25.   (original): The method of claim 21, after restoring the identified objects, further comprising providing access to the identified objects.

26.   (original): The method of claim 1, further comprising optimizing the identified objects by restoring a volume of the datastore and recovering corresponding objects.

27.   (original): The method of claim 1, further comprising optimizing the identified objects by grouping the identified objects, wherein the grouped objects have backups residing on the same volume of the datastore.

28.   (canceled).

29.   (original): The method of claim 1, wherein the one or more individual objects to be recovered to a target time are recovered from a current time.

30.   (original): The method of claim 29, wherein the current time represents at time at which the database system crashed.

31.   (currently amended): An apparatus for recovering data in a database of a database system, comprising:

a computer having a data store connected thereto, wherein the data store stores data; and

one or more computer programs, performed by the computer, for scanning a database log, wherein the database log records activities related to the database and for identifying one or more individual objects to be recovered to a target time with reference to a backup time.

<u>wherein an object is associated with different units of recovery, wherein one or more</u>

<u>units of recovery require different levels of processing, and wherein the object is recovered</u>

<u>utilizing the highest level of processing</u>.

32.   (original): The apparatus of claim 31, wherein the target time is user-defined.

33.   (original): The apparatus of claim 31, wherein the backup time is user-defined.

34.   (original): The apparatus of claim 31, further comprising analyzing the database

log to detect when a unit of recovery begins and when the unit of recovery ends.

35.   (original): The apparatus of claim 34, wherein an object is not recovered when

the unit of recovery accessing that object ends before the target time and there are no pending

writes for the object.

36.   (original): The apparatus of claim 35, wherein the unit of recovery begins and

ends before a checkpoint time, and wherein the checkpoint time occurs before the target time.

37.   (original): The apparatus of claim 35, wherein the unit of recovery begins before

a checkpoint time, and wherein the unit of recovery ends after the checkpoint time but before the

target time.

38.   (original): The apparatus of claim 35, wherein the unit of recovery begins after a

checkpoint time, and wherein the unit of recovery ends before the target time.

39.   (original): The apparatus of claim 34, wherein an object is recovered if the unit of

recovery begins before the target time, and wherein the unit of recovery ends after the target time

but before a current time, wherein the current time represents when object data is recorded to the

database.

40.   (original): The apparatus of claim 39, wherein the unit of recovery begins before a checkpoint time.

41.   (original): The apparatus of claim 39, wherein the unit of recovery begins after a checkpoint time but before the target time.

42.   (original): The apparatus of claim 34, wherein an object is recovered if the unit of recovery begins after the target time, and wherein the unit of recovery ends before a current time, wherein the current time represents when object data is recorded to the database.

43.   (original): The apparatus of claim 31, wherein a backup is taken.

44.   (original): The apparatus of claim 43, wherein the backup occurs prior to the target time and further comprising restoring data without restoring the database log.

45.   (original): The apparatus of claim 43, wherein the backup occurs after the target time and further comprising restoring data and optionally restoring the database log.

46.   (original): The apparatus of claim 43, further comprising restarting the database system with a conditional restart with defer all option.

47.   (original): The apparatus of claim 31, further comprising flushing cache data to disk.

48.   (original): The apparatus of claim 31, further comprising truncating the database log at the target time.

49.   (original): The apparatus of claim 48, further comprising disabling access to the database and restarting the database system, wherein restarting detects uncommitted units of recovery.

50.   (original): The apparatus of claim 49, further comprising creating a compensation log and appending the compensation log to the truncated database log beginning from the target time.

51.   (original): The apparatus of claim 31, further comprising restoring the identified objects.

52.   (original): The apparatus of claim 51, further comprising determining whether the database log should be applied to the restored objects to update the identified objects with current object data.

53.   (original): The apparatus of claim 52, when the determination is made to apply the database log to the identified objects, further comprising optimizing the identified objects such that the identified objects may be restored without applying the database log to the identified objects.

54.   (original): The apparatus of claim 53, if the objects can not be optimized, applying the database log to the restored objects.

55.   (original): The apparatus of claim 51, after restoring the identified objects, further comprising providing access to the identified objects.

56.   (original): The apparatus of claim 31, further comprising optimizing the identified objects by restoring a volume of the datastore and recovering corresponding objects.

57.   (original): The apparatus of claim 31, further comprising optimizing the identified objects by grouping the identified objects, wherein the grouped objects have backups residing on the same volume of the datastore.

58.   (canceled).

59.   (original): The apparatus of claim 31, wherein the one or more individual objects to be recovered to a target time are recovered from a current time.

60.   (original): The apparatus of claim 59, wherein the current time represents at time at which the database system crashed.

61.   (currently amended): An article of manufacture comprising a computer program carrier readable by a computer and embodying one or more instructions executable by the computer for recovering data in a database of a database system, comprising:

scanning a database log, wherein the database log records activities related to the database; and

identifying one or more individual objects to be recovered to a target time with reference to a backup time,

wherein an object is associated with different units of recovery, wherein one or more units of recovery require different levels of processing, and wherein the object is recovered utilizing the highest level of processing.

62.   (original): The article of manufacture of claim 61, wherein the target time is user defined.

63.   (original): The article of manufacture of claim 61, wherein the backup time is user defined.

64.   (original): The article of manufacture of claim 61, further comprising analyzing the database log to detect when a unit of recovery begins and when the unit of recovery ends.

65.   (original): The article of manufacture of claim 64, wherein an object is not recovered when the unit of recovery accessing that object ends before the target time and there are no pending writes for the object.

66.   (original): The article of manufacture of claim 65, wherein the unit of recovery begins and ends before a checkpoint time, and wherein the checkpoint time occurs before the target time.

67.   (original): The article of manufacture of claim 65, wherein the unit of recovery begins before a checkpoint time, and wherein the unit of recovery ends after the checkpoint time but before the target time.

68.   (original): The article of manufacture of claim 65, wherein the unit of recovery begins after a checkpoint time, and wherein the unit of recovery ends before the target time.

69.   (original): The article of manufacture of claim 64, wherein an object is recovered if the unit of recovery begins before the target time, and wherein the unit of recovery ends after the target time but before a current time, wherein the current time represents when object data is recorded to the database.

70.   (original): The article of manufacture of claim 69, wherein the unit of recovery begins before a checkpoint time.

71.   (original): The article of manufacture of claim 69, wherein the unit of recovery begins after a checkpoint time but before the target time.

72.   (original): The article of manufacture of claim 64, wherein an object is recovered if the unit of recovery begins after the target time, and wherein the unit of recovery ends before a current time, wherein the current time represents when object data is recorded to the database.

73.   (original): The article of manufacture of claim 61, wherein a backup is taken.

74.   (original): The article of manufacture of claim 73, wherein the backup occurs prior to the target time and further comprising restoring data without restoring the database log.

75.   (original): The article of manufacture of claim 73, wherein the backup occurs after the target time and further comprising restoring data and optionally restoring the database log.

76.   (original): The article of manufacture of claim 73, further comprising restarting the database system with a conditional restart with defer all option.

77.   (original): The article of manufacture of claim 61, further comprising flushing cache data to disk.

78.   (original): The article of manufacture of claim 61, further comprising truncating the database log at the target time.

79.   (original): The article of manufacture of claim 78, further comprising disabling access to the database and restarting the database system, wherein restarting detects uncommitted units of recovery.

80.   (original): The article of manufacture of claim 79, further comprising creating a compensation log and appending the compensation log to the truncated database log beginning from the target time.

81.   (original): The article of manufacture of claim 61, further comprising restoring the identified objects.

82.   (original): The article of manufacture of claim 81, further comprising determining whether the database log should be applied to the restored objects to update the identified objects with current object data.

83.   (original): The article of manufacture of claim 82, when the determination is made to apply the database log to the identified objects, further comprising optimizing the identified objects such that the identified objects may be restored without applying the database log to the identified objects.

84.   (original): The article of manufacture of claim 83, if the objects can not be optimized, applying the database log to the restored objects.

85.   (original): The article of manufacture of claim 81, after restoring the identified objects, further comprising providing access to the identified objects.

86.   (original): The article of manufacture of claim 61, further comprising optimizing the identified objects by restoring a volume of the datastore and recovering corresponding objects.

87.   (original): The article of manufacture of claim 61, further comprising optimizing the identified objects by grouping the identified objects, wherein the grouped objects have backups residing on the same volume of the datastore.

88.   (canceled).

89.   (original): The article of manufacture of claim 61, wherein the one or more individual objects to be recovered to a target time are recovered from a current time.

90.   (original): The article of manufacture of claim 79, wherein the current time represents at time at which the database system crashed.

91.   (previously presented):   The method according to claim 1, wherein said target time represents a time to which the database is restored.

92.   (previously presented):   The method according to claim 1, wherein said backup time represents a time at which a backup of the database is created.

93.   (previously presented):   The apparatus according to claim 31, wherein said target time represents a time to which the database is restored.

94.   (previously presented):   The apparatus according to claim 31, wherein said backup time represents a time at which a backup of the database is created.

95.   (previously presented):   The article of manufacture according to claim 61, wherein said target time represents a time to which the database is restored.

96.   (previously presented):   The article of manufacture according to claim 61, wherein said backup time represents a time at which a backup of the database is created.